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being equidistantly spaced apart from each other and engagingly bordering said area from both sides, at least said area being adapted for receiving immobilized specific binding partners, said specific binding partners being capable of coupling complementarily associated binding partners directly or via further specific binding molecules, said area having a minimum width adapted for capture of at least one complementarily associated being partner provided with one electrically conductive particle within said area in such a way as to allow for formation of a respective tunnel contact junction between the particle and the electrodes.

2. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein said width is under 800 nm.

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3. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the immobilized specific binding partners covers the electrodes with a thickness which permits tunnel effects.

4. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the electrodes are each two micro-electrodes arranged in a pair, the electrodes being

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connected to an amplifier circuit with an associated measuring and evaluating unit so that an electric current flow across the area can be detected when there is a voltage applied across the electrodes.

5. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 4, wherein the electrodes are part of the amplifier circuit and project from out of the latter.

6. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 5, wherein the amplifier circuit is a component of a microchip.

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7. (Amend) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the electrodes are comb-like structures opposingly meshed, whereby there are located affinity areas at least between the respective opposing electrodes.

8. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 7, wherein the comb-like electrodes and the affinity areas are arranged on a common chip surface.

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9. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 8, wherein the chip surface is formed by a silicon wafer.

10. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 8, wherein the chip surface is formed by a glass target.

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11. (Amended) Affinity sensor for detecting specific molecular binding events as claimed claim 7, wherein the comb-like electrodes are arranged in geometrical symmetry to interdigital structures and a plurality of affinity areas is arranged in a matrix, whereby the electrodes provided outside of the affinity areas are separated from each other at their intersections by an insulating layer arranged between the intersections.

12. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 7, wherein the length of the micro-electrodes is 0.1 mm, the width of the area is 0.1 µm and its effective height is 0.02 µm as well as the affinity areas is at a 1:10 ratio relative to the chip surface.

13. (Amended) Affinity sensor for detecting specific molecular binding events as claim 7, wherein in addition to the affinity areas at

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least one reference area is provided which carries inactive binding partner for a reference measurement instead of the specific binding partners.

14. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 7, wherein the occupation density of the specific binding partners on the individual affinity areas is different.

15. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 7, wherein the individual affinity areas carry different specific binding partners.

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16. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, 13, 14 or 15, wherein a plurality of reference areas is provided being occupied with different inactive binding partner.

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17. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the specific binding partners enter into coordination compounds.

18. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the specific binding partners are bioactive or biomimetic molecules.

19. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 17, wherein the specific binding partners are nucleic acids.

20. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 17, wherein the specific binding partners are proteins.

21. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 17, wherein the specific binding partners are saccharides.

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22. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the conductive particles are of sizes in the range of 0.1 μm to 5 μm.

23. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the conductive particles are of sizes in the nanometer range.

24. (Amended) Affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the conductive particles consist of metal-cluster compounds.

25. (Amended) Method of using the affinity sensor for detecting specific molecular binding events as claimed in claim 1, wherein the affinity sensor is utilized for the detection of complementarily associated binding partners in the form of complex compounds.

26. (Amended) Method according to claim 25, wherein the affinity sensor is utilized for the detection of complementarily associated binding partners in the form of bioactive and biomimetical molecules.

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27. (Amended) Method according to claim 25, wherein the affinity sensor is utilized for the detection of complementarily associated binding partners in the form of nucleic acids.

28. (Amended) Method according to claim 25, wherein the affinity sensor is utilized for the detection of complementarily associated binding partners in the form of proteins.

29. (Amended) Method according to claim 25, wherein the affinity sensor is utilized for the detection of complementarily associated binding partners in the form of saccharides.

30. (Amended) Method according to claim 24, wherein the affinity sensor is utilized for biomonitoring.

31. (Amended) Method according to claim 30, wherein the affinity sensor is utilized for the detection of cells.

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32. (Amended) Method according to claim 30, wherein the affinity sensor is utilized for the detection of microorganisms.

33. (Amended) Method according to claim 30, wherein the affinity sensor is utilized for the detection of genetic and microbic diseases.

34. (Amended) Method according to claim 30, wherein the affinity sensor is utilized for the detection of gene expression.

35. (Amended) Method according to claim 32, wherein the affinity sensor is utilized for the detection of microorganisms in ecological populations.

36. (Amended) Method according to claim 30, wherein the affinity sensor is utilized for medical diagnostics.

The changes in the claims are shown by brackets and underscoring in the Appendix hereto.